Coffee Break Training - Fire Protection Series

Hazardous Materials: Bulk Liquid Oxygen Separation

No. FP-2013-21REV May 21, 2013

Learning Objective: *The student shall be able to list examples of separation distances between bulk liquid oxygen systems and other exposures.*

We learn in basic fire chemistry that oxygen is one of the legs with heat and fuel that completes the fire triangle. Consequently, when combustible materials are in the presence of significant amounts of pure oxygen — such as in the illustrated liquid oxygen installation — extra precautions must be taken to prevent a fire or minimize its consequences.

One method to reduce the likelihood of a fire is to separate the oxygen source from other exposures. National Fire Protection Association 55, *Compressed Gases and Cryogenic Fluids Code* includes the following table of exposures and recommended separation distances.

The bulk liquid oxygen container (right) must be separated from a variety of exposures due to its chances of worsening fires.

Exposure	ft	m
Buildings of Type I and II construction as described in the building code	1	0.3
Buildings of Type III, IV and V construction as described in the building code	50	15
Wall openings (measured from high-pressure or liquefied gas regulators, pressure relief devices, vaporizers, manifolds and interconnected piping)	10	3
Property lines	5	1.5
Public sidewalks and parked vehicles	10	3
Public assembly occupancies	50	15
Areas occupied by nonambulatory patients (measured from the primary pressure relief device discharge vent and fill/vent connections)	50	15
Exterior walls that form a three-sided court around the container	†	†
Aboveground storage of flammable and combustible liquids		
0 to 1,000 gallons (0 to 3785 L)	25	7.5
More than 1,000 gallons (3785 L)	50	15
Underground or vault storage of flammable and combustible liquids		
Horizontal distance from oxygen vessel to tank or vault	15	4.6
Horizontal distance from oxygen vessel to fill/vent connections or other tank openings	25	7.5
Aboveground flammable gases		
Liquefied hydrogen (any amount)	75	22.5
Other liquefied gas, 0 to 1,000 gallons (0 to 3785 L)	25	7.5
Other liquefied gas, more than 1,000 gallons (3785 L)	50	15
Nonliquefied or dissolved gases, 0 scf* to 25,000 scf (0 Nm^3 to 708 Nm^3)	25	7.5
Nonliquefied or dissolved gases, more than 25,000 scf (708 Nm^3)	50	15
Rapidly burning solids, including, but not limited to, excelsior, paper or combustible waste	50	15
Slowly burning solids, including, but not limited to, heavy timber or coal	25	7.5
Inlets to underground sewer or drainage systems (measured from liquid delivery connections, pressure relief outlets, mobile supply equipment and liquid withdrawal connections)	8	2.5
Areas below connections where liquids can fall during loading and unloading operations and system operation, from combustible surfaces including, but not limited to, asphalt or bitumastic paving and expansion joint fillers	3	1
Encroachment by overhead utilities		
Horizontal distance from the vertical place below the nearest overhead wire of an electric trolley, train or bus line	50	15
Horizontal distance from the vertical place below the nearest other types of overhead wires	5	1.5
Piping containing hazardous materials	15	4.6

 † Refer to section 8.13.2.7 of NFPA 55. *Standard cubic foot. The SI equivalent is a Newton or normal cubic meter.

For additional information, refer to NFPA 55, *Compressed Gases and Cryogenic Fluids Code*.